What is Claimed is:

[c1] A metal plating apparatus comprising:

a source material electrically connected to a first terminal of a power supply;

an object to be plated electrically connected to a second terminal of the power supply; and

at least a pair of conductive perforated plates electrically connected to each other, and the at least pair of conductive perforated plates are disposed between the source material and the object.

[c2] The metal plating apparatus according to claim 1 further comprising a plating tank filled with a plating solution in which the source material, the object, and the conductive perforated plates are immersed.

[c3] The metal plating apparatus according to claim 1, wherein said conductive perforated plate disposed on the object side is in the vicinity of the object but not in contact with the object, and said conductive perforated plate disposed on the source material side is in the vicinity of the source material but not in contact with the source material.

[c4] The metal plating apparatus according to claim 3, wherein the at least pair of conductive perforated plates is electrically separated from the source material and the object.

[c5] The metal plating apparatus according to claim 1, wherein the first terminal of the power supply is an anode and the second terminal of the power supply is a cathode.

[c6] The metal plating apparatus according to claim 1, wherein said pair of conductive perforated plates are electrically connected by a conductor.

[c7] The metal plating apparatus according to claim 6, wherein the conductor comprises a material that has a chemical resistance to the plating solution.

[c8] The metal plating apparatus according to claim 7, wherein the material comprises copper.

[c9] The metal plating apparatus according to claim 6 further comprising a clip to connect the conductor to said conductive perforated plate.

[c10] The metal plating apparatus according to claim 9, wherein the clip comprises copper wire covered with vinyl chloride.

[c11] The metal plating apparatus according to claim 1, wherein the shape and size of the conductive perforated plates are substantially the same as those of the object.

[c12] The metal plating apparatus according to claim 1, wherein the conductive perforated plates comprise holes having a cross-sectional area of about 5 mm square at intervals of about 0.5 mm.

[c13] The metal plating apparatus according to claim 3, wherein the spacing between said conductive perforated plate disposed on the object side and the object is about 10 cm or less.

[c14] The metal plating apparatus according to claim 13, wherein the spacing is about 2 cm or less.

[c15] The metal plating apparatus according to claim 1, wherein the source material comprises a plating metal including Cu, Ag, Au, Zn, Cd, In, Sn, Pb, Cr, Fe, Co, Ni, Pt, Rh, or the like, or a plating metal alloy including Cu-Zn, Cu-Cd, Au-Ag, Au-Cu, Ag-Cd, Sn-Zn, Ni-Sn, Pb-Sn, Ni-Zn, Ni-Co, Ni-Mo, or the like.

[c16] The metal plating apparatus according to claim 1, wherein said pair of conductive perforated plates comprise metal insoluble to a plating solution.

[c17] The metal plating apparatus according to claim 16, wherein said metal comprises titanium or stainless steel.

[c18] The metal plating apparatus according to claim 1 further comprising:
an insulating adjustment plate disposed between the object and the conductive perforated plate on the side of the object, wherein a plurality of windows are provided in said insulating adjustment plate corresponding to a plurality of

portions of the object to be plated.

[c19] The metal plating apparatus according to claim 18, wherein the insulating adjustment plate is disposed on the surface of the conductive perforated plate on the side of the object.

[c20] The metal plating apparatus according to claim 18, wherein the windows of said insulating adjustment plate correspond to the plurality of the portions of the object to be plated so that the current density on the object is substantially constant.

[c21] The metal plating apparatus according to claim 18, wherein said insulating adjustment plate comprises an electrically insulating material including synthetic resin sheets.

[c22] The metal plating apparatus according to claim 21, wherein the synthetic resin sheets comprise polyester resin, polypropylene resin, polyethylene resin, polyvinylidene fluoride, epoxy resin, phenol resin, polyimide resin, or the like.

[c23] A metal plating apparatus comprising:
a source material electrically connected to a first terminal of a power supply;
an object having a plurality of portions to be plated, the object electrically connected to a second terminal of the power supply; and
an insulating adjustment plate disposed between the source material and the object in the vicinity of the object, wherein a plurality of windows are provided in said insulating adjustment plate corresponding to the plurality of portions of the object to be plated.

[c24] The metal plating apparatus according to claim 23 further comprising: a plating tank filled with a plating solution in which the source material, the object, and the insulating adjustment plate are immersed.

[c25] The metal plating apparatus according to claim 23, wherein the windows of said insulating adjustment plate correspond to the plurality of the portions of the object to be plated so that the current density on the object is substantially

constant .

[c26] The metal plating apparatus according to claim 23, wherein said insulating adjustment plate comprises an electrically insulating material including synthetic resin sheets.

[c27] The metal plating apparatus according to claim 26, wherein the synthetic resin sheets comprise polyester resin, polypropylene resin, polyethylene resin, polyvinylidene fluoride, epoxy resin, phenol resin, polyimide resin, or the like.

[c28] The metal plating apparatus according to claim 23, wherein said insulating adjustment plate in the vicinity of the object is not in contact with the object.

[c29] A method of forming an equi-voltage surface for plating an object comprising: providing lines of electric field which are directed to a surface of the object; and adjusting the lines of electric field to provide parallel lines of electric field terminating on the surface of the object.

[c30] The method according to claim 29, wherein said step of adjusting the lines of electric field also provides an equi-voltage surface on the surface of the object.

[c31] The method according to claim 29, wherein said step of adjusting the lines of electric field also provides a uniform density of lines of electric field terminating on the surface of the object.

[c32] The method according to claim 29, wherein said step of adjusting the lines of electric field is independent of said step of providing lines of electric field.

[c33] The method according to claim 29, wherein said step of adjusting the lines of electric field are separated from the object.

[c34] The method according to claim 29, wherein said step of adjusting the lines of electric field is performed by a pair of conductive perforated plates electrically connected to each other.